

## CLAIMS

1- A tube assembling device consisting of flexible hubs and hub-carriers designed for tubes of various diameters and allowing the assembly of raw tubes which may be cut at the required length and may be used without any modification of their end sections, for erecting two- or three- dimensional rigid or elastic structures. Those structures are fitted for the teaching, the study and the application of Geometry, Chemistry or any other subject whose teaching is often eased by the building of two- or three- dimensional structures as well as by the modeling of other structural elements fitted for any other use, said hubs of this said tube assembling device comprise a conical axial part or a flat axial part with a hole in the middle of the said axial part, around which are set out: on one hand , flexible tongues (3) showing a narrow part in the middle of their length and , on the other hand, radial rings (4) showing catching teeth (5, 6, 7) , said catching teeth are steered according to the axis of the hub, so that said flexible tongues (3) may be inserted inside the tubes used in the assembly, folded at the level of their narrow section or unfolded and so that links (21) of the structure can be fixed at the basis of catching teeth (5, 6, 7) of said radial rings (4). Said Flexible hub-carriers can connect tubes and hubs can be placed on said hub-carriers, said hub-carriers show radial external hook-shaped expansions (2) and show 2 pairs of half rings, one posterior pair (9) and one anterior pair (8) linked by four connecting lugs (10, 11), said lugs of said hub-carriers are moved with 90° around an antero-posterior axis, from these said pairs of half-rings come out at least one pair of tongues (1) pointing in the direction of the pair of half rings (9) located at the opposite side of the basis of the said pair of tongues so that when a tube is inserted into the hub-carrier either all tongues (1, 14) remain outside and positioning of said hub-carrier is made

all along the tube which is slightly compressed between the tongues (1, 14) , or some tongues (1, 14) are inserted inside the said tube and positioning of the hub-carrier occurs at tube's end.

2- A tube assembling device according to claim 1 wherein the said hub-carrier comprise 4 connecting lugs (10, 11) who have flexible hook-shaped radial expansions (2) enabling to fix elastic links (21) which may bind the different structural elements and lock one or several said hubs which may be fixed on the hub-carrier. In that case the pressure applied by the hubs, when hub-carrier is fixed along the tube, i.e. when tongues (1, 14) remain outside the tube, increases the pressure applied by the tongues (1, 14) on the tube, and, when the tongues (1-14) are inserted inside the tube, i.e. when hub-carrier is fixed at a tube's end, said tube is squeezed between the tongues (1, 14) located inside the tube and the half rings (8, 9) located outside the same tube.

3- A tube assembling device according to claim 1 wherein divergent tongues (12) of a said hub-carrier are issued from anterior half rings of said hub-carrier and in which said divergent tongues show expansions (13) before and after the median zone of said divergent tongues, between these said expansion hubs are fixed on said hub-carriers.

4- A tube assembling device according to claim 1 wherein hub-carriers shows tongues (1) coming from anterior half rings (8) of said hub-carrier, said tongues converge towards the axis of said hub-carrier and go towards the posterior part of said hub-carrier.

5- A tube assembling device according to claim 1 wherein hub-carrier shows a pair of divergent tongues (14) issued from posterior half rings (9) going to the anterior half rings (8) of said hub-carrier, said tongues (14) have a maximal width superior to the open space left between the connecting lugs

(10, 11) of said hub-carrier so that said divergent tongues may be locked inside the hub-carrier when they are pushed inside said hub-carrier.

6- A tube assembling device according to claim 1 wherein connecting lugs (10, 11) of said hub-carrier show an inferior thickness where the second pair of tongues (14) of said hub-carrier are located when pushed into said hub-carrier.

7- A tube assembling device according to claim 1 wherein tongues (1, 14) of said hub-carriers show first a narrow proximal half part and then widen in their middle part to reach their maximal width so that when tubes are inserted through the two ends of a said hub-carrier, tongues (1) issued from anterior half rings (8) come into the inserted tube through the posterior part of said hub-carrier and tongues (14) issued from posterior half rings (9) come into the inserted tube through the anterior part of said hub-carriers. Thus the two pairs of tongues (1, 14) cross each other and the proximal parts of each pair close on the distal parts of the other pair of said tongues which enables two tubes to be connected by their ends.

8- A tube assembling device according to claim 1 wherein superior connecting lugs (10) of said hub-carriers link the lateral posterior parts of one anterior half ring (8) of said hub-carriers to the upper parts of left and right posterior half rings (9) of said hub-carriers and that inferior connecting lugs (11) of said hub-carriers link the lateral posterior parts of the second anterior half ring (8) of said hub-carriers to the lower parts of left and right posterior half rings (9) of said hub-carriers.

9-A tube assembling device according to claim 1 wherein catching teeth of radial rings (4) of said hubs are anchor-shaped (6) so that the pulling force of the links (21) may be aimed towards many different directions without links (21) getting loose from the said tooth (6).

10- A tube assembling device according to claim 1 wherein catching teeth of radial rings (4) of said hubs are perforated by a hole which diameter is large enough to allow the insertion of a tube used for building the structure.

5        11- A tube assembling device according to claim 1 wherein radial rings (4) of said hubs show external prominent zones (22) to lock the radial rings (4) when inserted into the axial hole of a said hub or when inserted into another radial ring (4) of a hub.

10        12- A tube assembling device according to claim 1 wherein the junction point between a radial ring (4) of a said hub and the inside catching tooth (5, 6, 7) of the said radial ring (4) is wider or thicker at least on the edges to avoid that this tooth turns inside out under the pulling force of the links (21).

15        13- A tube assembling device according to claim 1 wherein the junction point (23) between an inside tooth (5, 6, 7) of a radial ring (4) of a said hub and an axial ring (17) of the said hub shows a smoothed border in order not to damage the links it holds.

20        14- A tube assembling device according to claim 1 wherein the outer sides (18, 19) of anterior (8) and posterior (9) half rings of said hub-carriers show complementary convex and concave shapes so that 2 hub-carriers may build an oscillating or rotating balanced structure when placing complementary sides of two different hub-carriers face to face.

15- A tube assembling device according to claim 1 wherein tongues (1, 14) of said hub-carriers have a slightly narrower end part, bevel-edged towards the outside to ease insertion of said tongues (1, 14).

25        16- A tube assembling device according to claim 1 wherein tongues (3) of said hubs have an elongated hole at their basis so that another tongue (3) of a said hub may be inserted and remain fixed.

17- A device according to claim 1 wherein radial rings (4) of said hub show near the axial ring (17) of said hub a lug which connects the 2 sides of the

said radial ring (4) and enables, when 2 hubs are combined, to insert a tongue (3) inside the hole formed by this said lug and the hub's axial ring (17)

18- A device according to claim 1 wherein connecting lugs (23) linking one tooth (7) of a radial ring of a hub to the same radial ring show at least on one side a narrow axial depressed zone to increase the flexibility of the said tooth (7) enabling the insertion of a radial ring (4) and of its said tooth (7) into a tube of the structure.